LOWER WILLAMETTE GROUP REPONSES TO EPA'S JULY 9, 2009 COMMENTS ON THE PRE-FEASIBILITY STUDY TREATMENT TECHNOLOGIES TABLE

This memo provides responses to U.S. Environmental Protection Agency's (EPA's) comments from July 9, 2009 regarding the Lower Willamette Group's (LWG's) *Draft Pre-Feasibility Study Treatment Technologies Table* submitted to EPA on June 5, 2009. We appreciate the constructive nature of the comments. We intend to incorporate the recommendations from the specific comments (restated below) in the Draft FS report and will also update the *Draft Pre-Feasibility Study Treatment Technologies Table*, as appropriate and consistent with the overall content and conclusions of the Feasibility Study (FS) Report at that time. The revised table will be included as an attachment to the FS report. As requested, the LWG will consider these comments during development and screening of remedial alternatives.

Specific Comments –

1. In the table, composting was tentatively ruled out. However land treatment, described immediately above in the table, had identical language to composting. The rationale of screening out composting because of increased treatment residuals, isn't explicitly related to the effectiveness, implementability, and cost factors. If the technology is screened out due to higher costs associated with material handling and/or disposal, this should be reflected in the treatment cost column for the composting (showing a higher cost than land treatment).

   Agreed – costs will be revised accordingly in the final table attached to the FS Report.

2. Under thermal treatment, incineration is tentatively screened out. Incineration may be a required treatment option for a RCRA-listed waste prior to land disposal of treated residuals. If a process option is potentially required for legal reasons, it should be retained for analysis in the FS, at least until a thorough ARARs or waste disposal requirements analysis is completed.

   We agree that incineration may be necessary prior to the disposal of any RCRA-listed wastes generated by the project; however, at this time we do not believe that incineration implemented as a stand-alone treatment technology is a viable process option for this project.

3. Under incineration and pyrolysis both state that transportation costs are high. Mobile treatment may be used, if available, and may more cost effective than offsite thermal treatment if the treatment volumes are high enough. The technology has been used at number of sites around the country. Implementability of onsite treatment is likely to be challenging, due to public concern about the use of such technology. But for screening purposes, to screen out certain technologies based on transportation costs may be premature.

   Comment acknowledged. The technologies were screened out based on technical infeasibilities in addition to cost considerations.

4. The thermal desorption rationale mentions the potential for dioxin generation. Without performing a detailed process option technical analysis, that conclusion is surprising because the temperatures for thermal desorption are usually lower than the point where dioxins would be

formed. Even if they were formed within the desorption unit or were part of the desorbed organic material, air pollution controls can be effective in treating the emissions.

Comment acknowledged; this information will be considered in the FS Report, as appropriate.

5. All Biological/chemical in-situ methods are tentatively screened out, and a prime implementability consideration is that "Treatment area is extensive." As noted previously, the possibility of applying the process option to more limited areas, perhaps within AOPCs or SMAs, should be considered.

Comment acknowledged; this information will be considered in the FS Report, as appropriate.

6. The table states that Geotextile Tube Dewatering is "not regularly implemented." EPA disagrees with this statement. The Fox River and Ashtabula have used geotextile tubes to dewater large volumes of contaminated sediment. It should also be noted that at the Ashtabula River, sediments were piped approximately 3 miles to the dewatering site. Geotextile tubes may work for fine-grained sediments with proper coagulant treatment. In addition, bench scale testing is required to identify appropriate flocculants and dosages.

Comment acknowledged. In comparison to other dewatering methods, geotextile tubes are not implemented as often. The current Fox River dredging work (Operable Units 2 to 5) does not include geotextile tube dewatering methods.

7. EPA notes that variations of land treatment (e.g., composting and biopiles) were tentatively screened out. EPA acknowledges that the presence of site COCs such as PCBs, organochlorine pesticides and metals may prevent these technologies from achieving the desired cleanup levels. In addition, land treatment may have similar space requirements as to technologies such as composting and biopiles.

Comment acknowledged; this information will be considered in the FS Report, as appropriate.

8. Chemical extraction was tentatively screened out based on "limited effectiveness in treating PCBs" and because it “less demonstrated on a full scale basis than some other process options.” It should be noted that chemical extraction was successfully pilot-demonstrated at New Bedford Harbor which is contaminated with PCBs. Where metals and organics are both present in the sediment, which is typical, chemical extraction targeting organics would likely need to be coupled with other operations addressing removal/stabilization of metals.

Comment acknowledged. We are familiar with the New Bedford Harbor pilot demonstration. This demonstration has limited applicability to the Portland Harbor project as the goal of the pilot program was to reduce PCB concentrations to below 50 mg/kg to reduce the waste code from Subtitle C to Subtitle D; therefore, there are limited data available to determine the effectiveness of the pilot in treating to lower concentrations.

9. Thermal processes: Allowable content and implementability concerns related to permitting should be described. It should be noted that for vitrification, sediments must be dried to a very low water content, thus dewatering and drying would be required for both mechanical and

hydraulically dredged materials. Some thermal technologies require removal of relatively small metallic debris.

Comment acknowledged. These concerns will be evaluated during remedial alternative development.

10. Vitrification: Extended duration tests have been done with near full scale equipment, but how you define full scale is certainly an issue. If the treatment process can be separated from the dredging process (which requires staging/storage areas and rehandling), the capacity of the treatment process does not need to be as high and the scale of at least some demonstrations to date may be fairly representative. Scale up to capacity corresponding to dredge production has likely not been done for the thermal technologies.

Comment acknowledged. These concerns will be evaluated during remedial alternative development.

11. Dewatering: The relative cost of dewatering operations mentioned varies considerably but is not addressed. Degree of debris removal required varies depending upon the requirements of the dewatering equipment and any follow-on treatment processes.

Comment acknowledged; this information will be considered in the FS Report, as appropriate.

12. Mechanical Dewatering: Belt filter press circuits are continuous flow processes. Residence time is a matter of minutes. Plate and frame presses are batch processes, usually operated in parallel to achieve continuous operation. Residence time may be longer than for belt filter presses, but probably on the order of minutes to hours. In addition, mechanical dewatering typically requires a slurry feed from a hydraulic dredging operation. Bench scale testing would be needed to determine operational parameters and requirements.

Comment acknowledged; this information will be considered in the FS Report, as appropriate. As previously concluded by the October 2007 Treatability Study Literature Survey Technical Memorandum, any necessary bench-scale testing would be conducted during the design phase.

13. Reagent Dewatering: It should be noted that this operation is often performed on a barge negating the need for upland processing facilities.

Comment acknowledged; this information will be considered in the FS Report, as appropriate.

14. Blending: Blending, in and of itself, is essentially only dilution, not treatment. Blending with other materials is sometimes done as part of a compositing operation. This needs some clarification.

Agreed – text will be clarified accordingly in the final table attached to the FS Report.

15. Particle Separation: Bench scale testing to characterize the different size or density fractions is typically needed to assess feasibility. It cannot be assumed that coarse materials will be uncontaminated. The presence of condensed carbon phases and natural organic matter can result in higher concentrations in coarse size fractions than in fine. With physical separation, no

contaminant destruction takes place, therefore there will be residual materials requiring management and/or disposal.

Comment acknowledged; this information will be considered in the FS Report, as appropriate. As previously concluded by the October 2007 Treatability Study Literature Survey Technical Memorandum, any necessary bench-scale testing would be conducted during the design phase.

16. Cement Stabilization/Solidification: The question of whether dewatering is required prior to cement stabilization/solidification may be a question of logistics. Mechanically dredged sediments will be saturated, but since the volumes of water produced by mechanical dredging are much more limited, blending with stabilizing agents can be done in barges on wet materials. Where hydration of the blending agent is required, some water would actually be desirable. A similar operation could be performed on hydraulically dredged sediments after they have become sufficiently dewatered (passively) to permit handling, or after they were mechanically dewatered. The rehandling would result in additional cost, however.

Comment acknowledged; this information will be considered in the FS Report, as appropriate.

17. Processes that have only been demonstrated at bench scale are going to require some additional bench and/or pilot scale testing to establish operating parameters. This comment applies to all technologies listed that have only been demonstrated at bench scale.

Comment acknowledged; this information will be considered in the FS Report, as appropriate. As previously concluded by the October 2007 Treatability Study Literature Survey Technical Memorandum, any necessary bench-scale testing would be conducted during the design phase.

18. Sediment Washing: While organics may be oxidized through addition of certain reagents, metals will largely be transferred to the aqueous phase, producing a large wastewater volume that must be managed. In addition, as noted for some dewatering methods, process residence time is limited to the time required for the slurry to be pumped/flow through the various unit operations. Recycle may be required to achieve sufficient contaminant reduction in some cases, however, which would incrementally increase residence times.

Comment acknowledged; this information will be considered in the FS Report, as appropriate.